Definition

```
def GroupTernary(op,size,rd,rc,rb,ra) as
    d ← RegRead(rd, 128)
    c ← RegRead(rc, 128)
    b ← RegRead(rb, 128)
    case op of
        G.MUX:
            a ← (c and d) or (b and not d)
    endcase
    RegWrite(ra, 128, a)
enddef
```
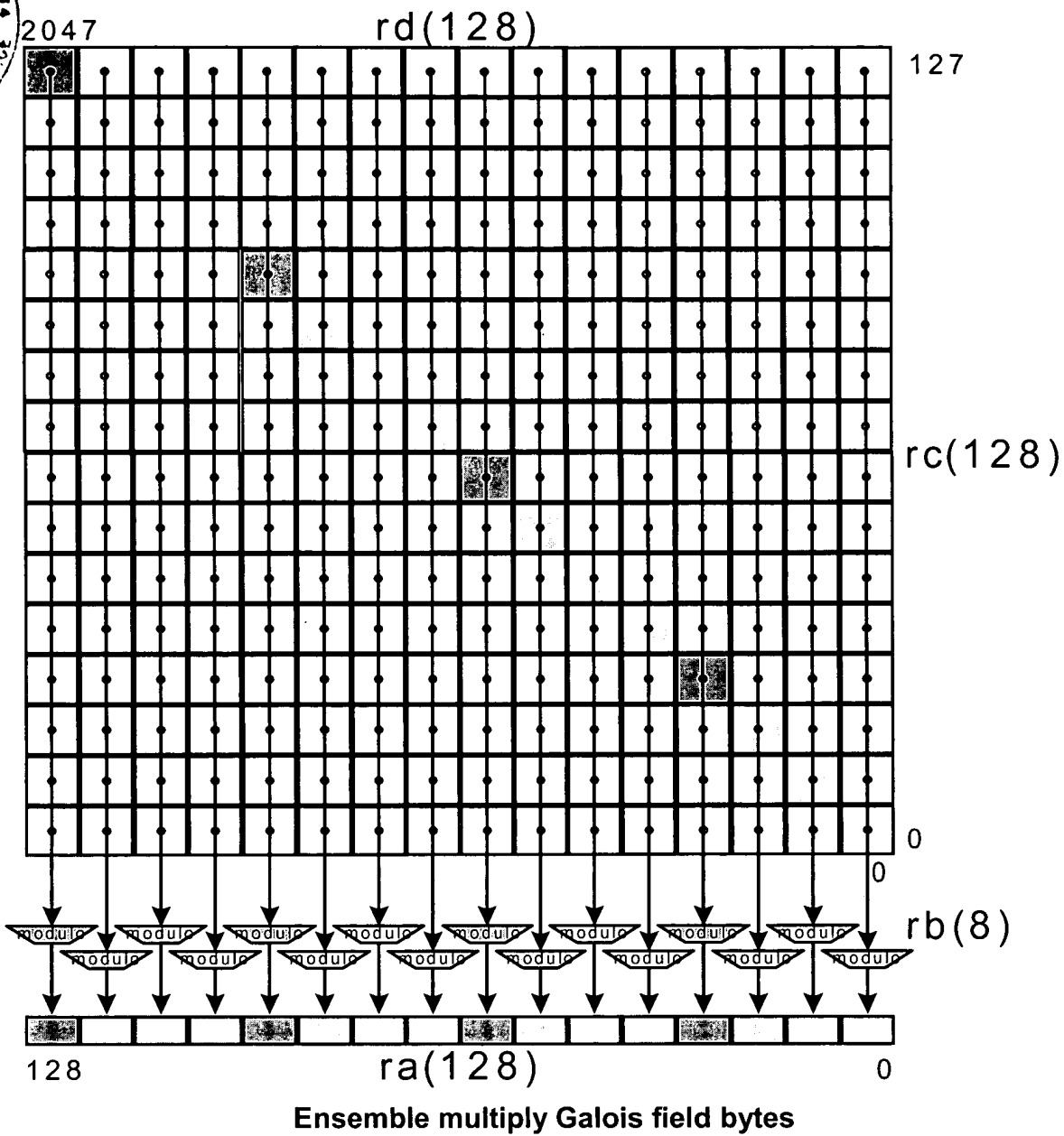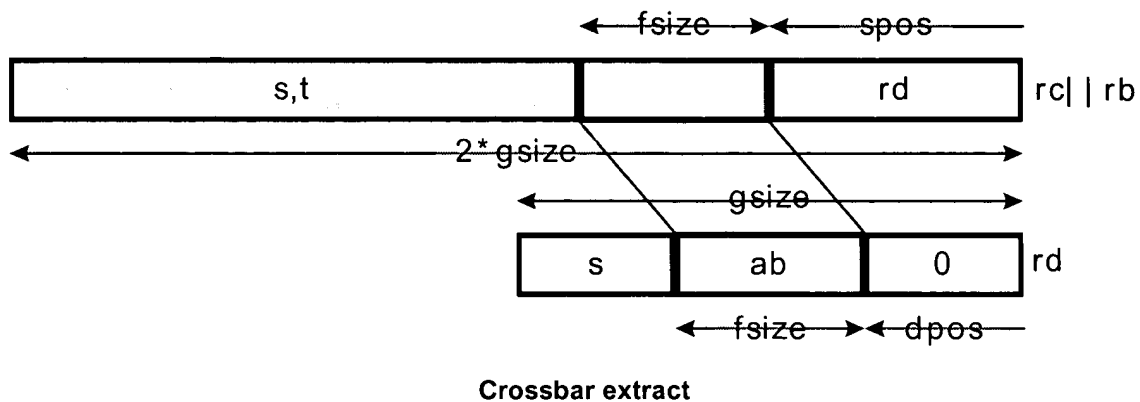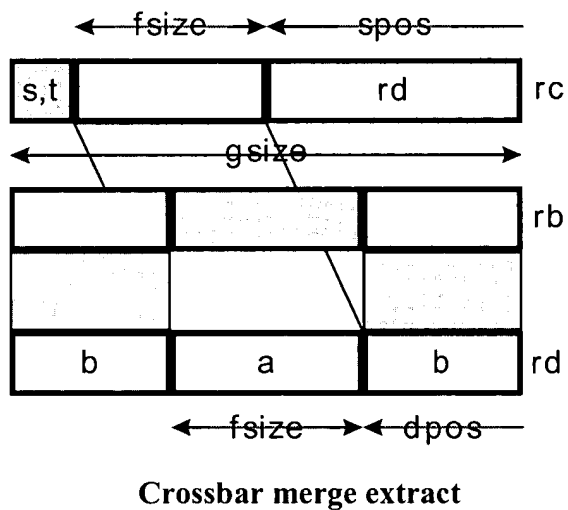
Exceptions

Fig. 31E

2047

rd(128)

127

rc(128)

0

0

rb(8)

128

ra(128)

0

Ensemble multiply Galois field bytes

Fig. 42D

Crossbar extract

Fig. 44C

Crossbar merge extract

Fig. 44D

encoding for crossbar field

Fig. 45D

crossbar deposit

Fig. 45E

crossbar withdraw
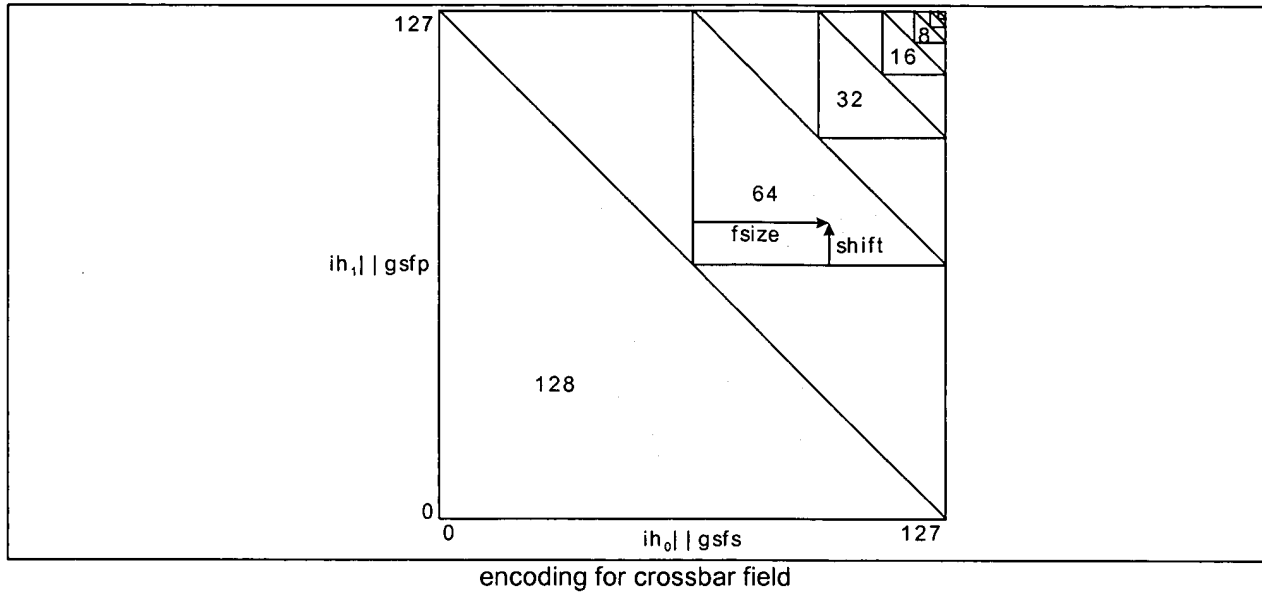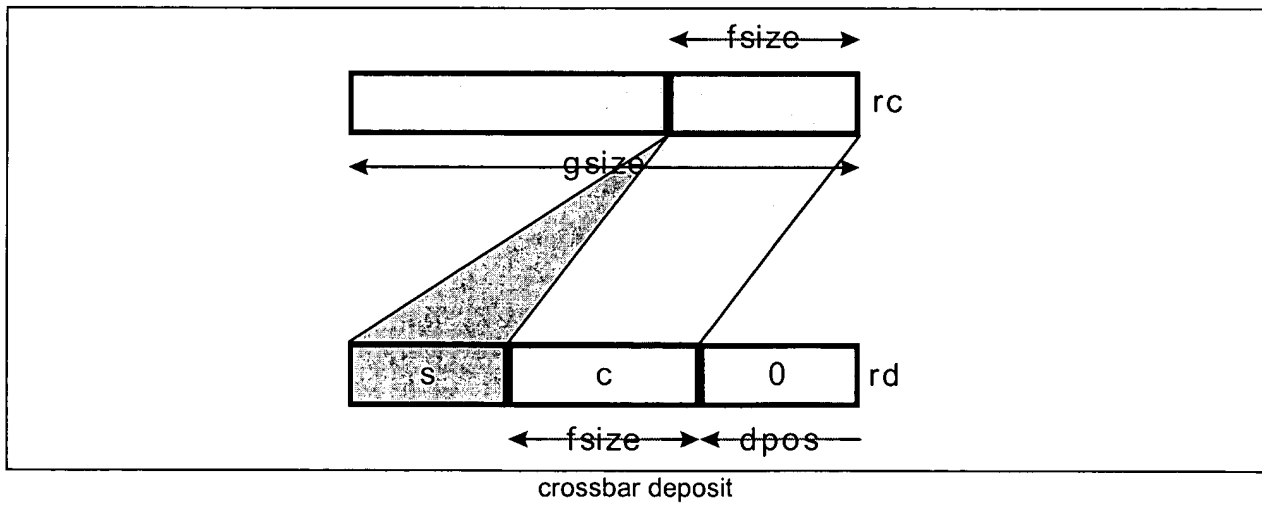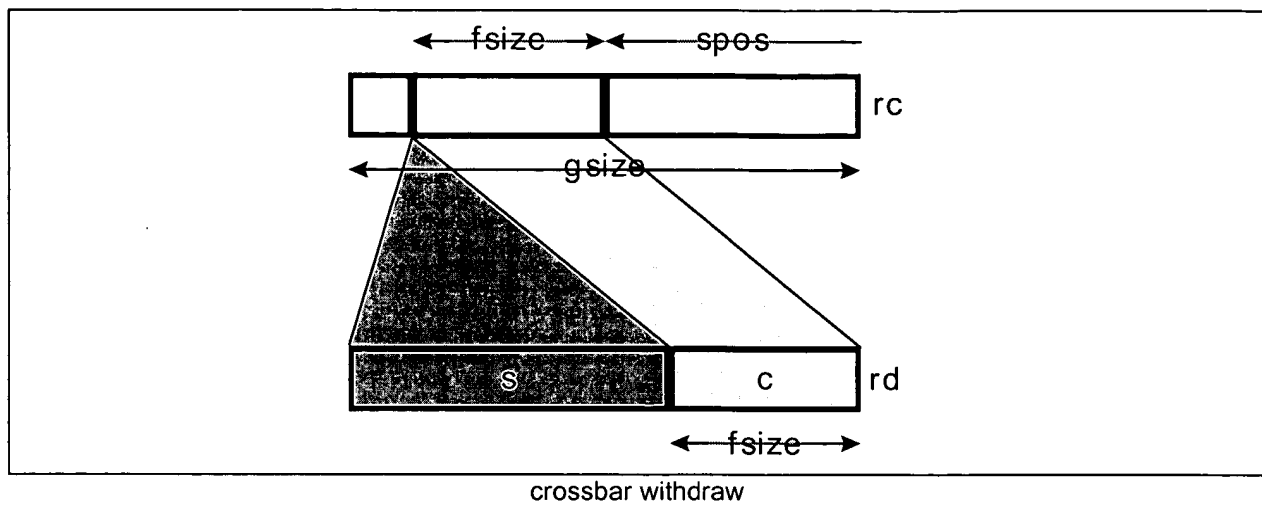
Fig. 45F

Operation codes

X.DEPOSIT.M.2	Crossbar deposit merge pecks
X.DEPOSIT.M.4	Crossbar deposit merge nibbles
X.DEPOSIT.M.8	Crossbar deposit merge bytes
X.DEPOSIT.M.16	Crossbar deposit merge doublets
X.DEPOSIT.M.32	Crossbar deposit merge quadlets
X.DEPOSIT.M.64	Crossbar deposit merge octlets
X.DEPOSIT.M.128	Crossbar deposit merge hexlet

Fig 45G

Format

X.op.gsize   rd@rc,isize,ishift

rd=xopgsize(rd,rc,isize,ishift)

31		26	25	24	23		18	17		12	11		6	5		0
op			**ih**		**rd**			**rc**			**gsfp**			**gsfs**		

6	2	6	6	6	6
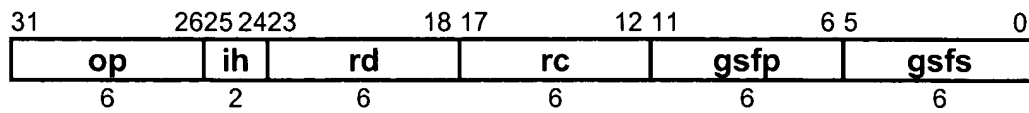
assert isize+ishift $\leq$ gsize
assert isize$\geq$1
ih_0 || gsfs $\leftarrow$ 128-gsize+isize-1
ih_1 || gsfp $\leftarrow$ 128-gsize+ishift

Fig 45H

Definition

```
def CrossbarFieldInplace(op,rd,rc,gsfp,gsfs) as
    c ← RegRead(rc, 128)
    d ← RegRead(rd, 128)
    case ((op₁ || gsfp) and (op₀ || gsfs)) of
        0..63:
            gsize ← 128
        64..95:
            gsize ← 64
        96..111:
            gsize ← 32
        112..119:
            gsize ← 16
        120..123:
            gsize ← 8
        124..125:
            gsize ← 4
        126:
            gsize ← 2
        127:
            raise ReservedInstruction
    endcase
    ishift ← (op₁ || gsfp) and (gsize-1)
    isize ← ((op₀ || gsfs) and (gsize-1))+1
    if (ishift+isize>gsize)
        raise ReservedInstruction
    endif
    for i ← 0 to 128-gsize by gsize
        a_{i+gsize-1..i} ← d_{i+gsize-1..i+isize+ishift} || c_{i+isize-1..i} || d_{i+ishift-1..i}
    endfor
    RegWrite(rd, 128, a)
enddef
```
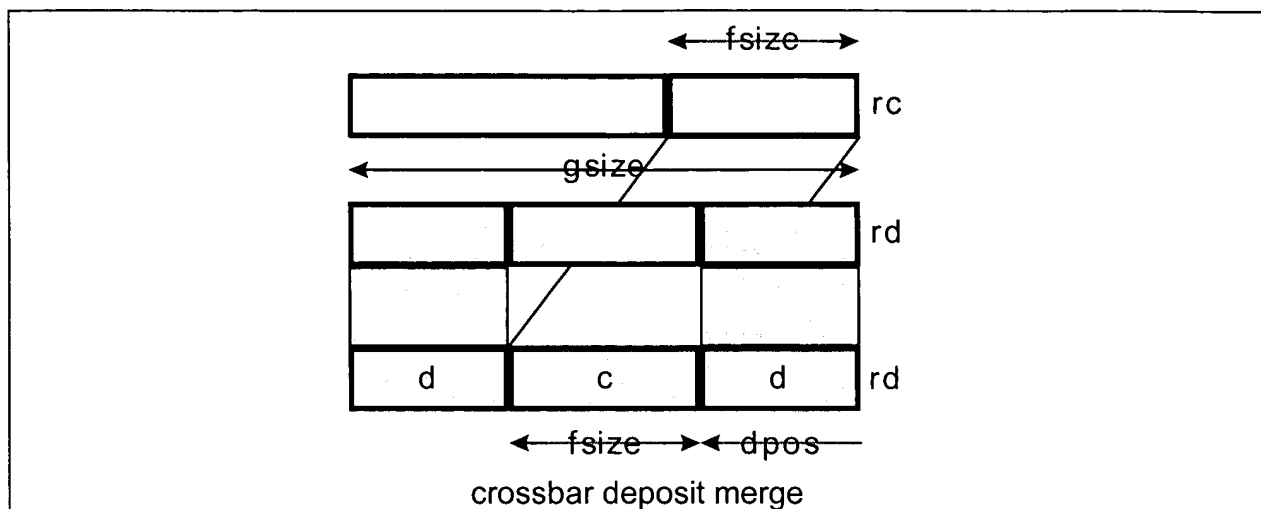
Exceptions

Reserved instruction

Fig 45I

crossbar deposit merge

Fig 45J